

1 system.

2 CHAIRMAN WILSON: So you don't see a positive
3 catalytic effect within the catalyst for either CO or
4 hydrocarbon, only for manganese?

5 MR. WILKINS: It just about -- there's a slight --
6 as you'll see in the data, there's a slight, slight
7 positive for CO but very slight and for hydrocarbons, the
8 catalyst has no effect on efficiency, either positive or
9 negative for hydrocarbons.

10 CHAIRMAN WILSON: What work have you done on the -
11 - to analyze the effect of -- over the -- you ran many tests
12 up to 75 thousand miles, what have you done to look at the
13 effect of the additive on the durability of the catalyst?
14 Have you done catalyst analyses?

15 MR. WILKINS: We have done very little on the
16 catalyst analyses themselves. The key part of the study
17 that we think is the most important is that we do not see
18 any adverse emission effects, rather positive effects.

19 In the real world, driving these 48 cars and comparing
20 these, we see the positive effects on the emissions at the
21 tailpipe.

22 We will -- we have looked at the surface of a few of
23 the catalysts. Most of them are still on the cars. And we
24 see no evidence of any plugging and the back pressure
25 measurements that we made, which are part of our waiver,

1 demonstrate there is no back pressure problems with the
2 catalysts.

3 CHAIRMAN WILSON: To your knowledge, has the auto
4 industry found problems with the use in Canada?

5 MR. WILKINS: I'm sorry?

6 CHAIRMAN WILSON: I'm asking whether to your
7 knowledge the auto industry found problems with the use of
8 MMT in Canada.

9 MR. WILKINS: As far as we can tell, there is no
10 evidence that there are any more problems with the United
11 States -- in Canada then there are in the United States.

12 That is, there are occasional catalysts that plug,
13 there are occasional catalysts that get too hot and are
14 destroyed, both in the United States and in Canada. To our
15 knowledge, there's no evidence that the situation is worse
16 in Canada than it is in the United States.

17 CHAIRMAN WILSON: Have you discussed your data
18 with auto industry and they're satisfied with your --

19 MR. WILKINS: In great detail. You have to
20 understand that this is the first time they're really seen
21 the significant effects of this product. The very positive
22 effects of this.

23 This sophisticated study really gave us the opportunity
24 to conclusively demonstrate the positive effects on the
25 tailpipe. These are new facts for them. They are material

1 they need to understand and we're confident by the time they
2 get done looking at this that they're going to be favorably
3 disposed towards the use of this product in gasoline.

4 As with anything new, there is obviously ^{some}~~so~~ resistance
5 initially but the positive effects on long-term on their
6 emission systems should outweigh any negatives.

7 CHAIRMAN WILSON: Similarly, I guess that while
8 the -- I guess on the issue of the slight hydrocarbon
9 increase, given all the activity both within EPA and within
10 Congress, the view of the urban smog problems, even little
11 bits of hydrocarbon seem hard to find sometimes.

12 Again, why -- why is it a good idea for us to accept a
13 product that even though it may be small, results in
14 hydrocarbon increases?

15 MR. WILKINS: We think that there's every
16 indication that if Hi Tec 3000 is used, the aromatic portion
17 of the gasoline can be reduced and we think that will
18 eliminate the hydrocarbon increase.

19 CHAIRMAN WILSON: There are other octane
20 enhancers, boosters, such as oxygenates that could achieve
21 the same result of lowering aromatics as well.

22 MR. WILKINS: But I think it's a balance. I
23 believe some of those have emission problems, too, don't
24 they? Ethanol, maybe?

25 CHAIRMAN WILSON: Well, as I've mentioned earlier,

1 hardly anybody comes to us with an issue that's all pros. I
2 just -- that's why I was asking.

3 MR. WILKINS: And I hope you won't forget the 20
4 per cent NOx reduction that the Hi Tec 3000 gives and if you
5 look at our tests, the measured emission of the three
6 pollutants was down almost eight per cent. If you look at
7 total emissions.

8 MS. SMITH: You indicated in your application that
9 a small percentage of the manganese comes out of the
10 tailpipe. Exactly where is the manganese depositing in the
11 vehicle, the catalyst or where else?

12 DR. TER HAAR: Balancing a tailpipe and an exhaust
13 system and a muffler and a catalyst and an exhaust system is
14 a very difficult thing to do. There is certainly evidence,
15 both from the catalytic effect and from examination of the
16 exhaust system that there's particular manganese on -- a
17 very fine coating on the surface of the exhaust system.

18 Apparently that's where the product is. Remember, over
19 the lifetime of the car, we only use four ounces of
20 manganese. Over the total lifetime of the car. A drop per
21 gallon. So there's a very small amount of material in the
22 -- used through the lifetime of the car.

23 The evidence is that the amount coming out of the
24 tailpipe in the relatively large number of cars we looked at
25 is very low level and its exact distribution throughout the

1 automobile would, I'm sure, depend on the particular
2 automobile and that has not been totally defined.

3 MS. SMITH: There is some that suggests that there
4 may be some deposition in the combustion chamber. Would you
5 agree or disagree with that?

6 DR. TER HAAR: I would think there would be some
7 deposition in the combustion chamber, a very small amount.

8 MS. SMITH: Is it the deposition in the catalyst
9 or the deposition in the combustion chamber that causes the
10 HC impact?

11 DR. TER HAAR: Certainly it's not in the catalyst
12 because there's no effect on the catalyst on efficiency.
13 The science there is not perfect. Not everyone understands
14 why there's a slight increase in hydrocarbons coming out.

15 Those like me with lots of experience in this area
16 think it's a trace of solids in the combustion chamber but
17 it also might be related to modification combustion
18 temperature because the additive was present there. A
19 slight slowing of the flame or something like that but my
20 prejudice is it's probably a trace of solid but that's by no
21 means positive.

22 MS. SMITH: You indicate in your application that
23 there might be -- there would be higher manganese emissions
24 for older cars than for the newer cars and when you did your
25 modeling in terms of total impact of manganese coming out of

1 the tailpipe in terms of atmospheric concentrations, which
2 vehicles did you use, older or newer cars?

3 DR. TER HAAR: The numbers I was talking to you
4 about today were using the cars that we used in this
5 particular program and these were the newer cars.

6 MS. SMITH: Have you done any calculations taking
7 into account the vehicle -- the distribution of vehicle age
8 out there?

9 DR. TER HAAR: We have done previous work on that
10 and could submit that to you for your consideration.

11 MS. SMITH: That might be helpful.

12 DR. TER HAAR: All right.

13 MS. SMITH: Ford presented a paper a while back
14 talking a little bit about depositions in catalysts and
15 plugging. There's another manufacturer who has expressed
16 concerns about -- these are Canadian catalysts --
17 depositions in catalysts and plugging. Could you comment on
18 the Ford paper?

19 DR. TER HAAR: The Ford paper really talks about
20 what they would call micro plugging. That is, not plugging
21 on the surface of the catalyst. If you've ever examined
22 one, it looks like a honeycomb on the front. The paper
23 addresses the concept that there might be a reduction in
24 efficiency because of plugging in the micro pores on the
25 surface of the catalyst.

1 What they have done there is use a laboratory technique
2 to try to simulate the real world and that laboratory
3 technique suggests a reduction of efficiency of the catalyst
4 because of the use of the product.

5 I believe you need to look at the data in the real
6 world with three million miles of driving saying there is no
7 effect from -- on the catalyst. There is no reduction in
8 efficiency, indeed, there's an appreciable improvement of
9 efficiency. A clear cut improvement in efficiency because
10 of the use of the catalyst. I believe one has to question
11 whether the laboratory technique they used simulates the
12 real world.

13 MS. SMITH: Have you looked at any Canadian
14 catalysts in terms of decreased efficiency?

15 DR. TER HAAR: Well, we mention the Petro-Canada
16 study. We don't have the details of that. The initial
17 reactions we get from that, that that's doing well.

18 MS. SMITH: You indicated that MMT would be used
19 to basically reformulate gasoline and it would be a
20 different formula than probably what you used in your test
21 program since you used clear fuel and then added MMT.

22 Would you see the same NOx and CO impacts if you
23 reformulate the gasoline as opposed to just adding MMT to
24 present gasolines?

25 DR. TER HAAR: We have submitted some of that

1 information in the appendices.

2 MR. BROWNELL: That information is in Appendix 6.

3 DR. TER HAAR: And it shows the same kind of
4 reductions for reformulated gasoline.

5 MR. BROWNELL: I'm sorry. That's Appendix 4.

6 MS. SMITH: Regarding ambient concentrations in
7 Canada, I think Canada has about a tenth of the vehicle
8 population of the United States, would that therefore impact
9 your predictions of what ambient concentrations would be
10 like in the U.S.?

11 DR. TER HAAR: I don't think so because the place
12 we're looking is in the cities. In cities like Toronto they
13 have high concentrations of cars like cities in the United
14 States.

15 They have far larger open areas but as you know, the
16 concentrations in air are very much a function of the
17 source, in this case the automobile engine or in the case of
18 Canada, as is pretty clear from the data up there, from
19 point sources are what are actually giving you that baseline
20 concentration.

21 I would expect that the situation in Canada for its
22 large cities is not going to be significantly different from
23 the United States.

24 MS. SMITH: You raised -- this is more of a legal
25 question. You raised in your application the fact that we

1 shouldn't be looking at potential future standards when
2 considering waiver requests and cited ... I believe way back
3 a couple of years ago for support.

4 I question that analysis. First of all, the case
5 doesn't specifically look at that issue, as to whether or
6 not you ought to use present or future day standards since
7 there were no future standards in 1985 and you point to a
8 provision in the statute that says -- and a discussion in
9 that case in which it talks about the waiver provision looks
10 at first introduction of fuels and in another subsection,
11 211, looks at what happens if you discover something about a
12 fuel after it's been introduced.

13 I don't know if that necessarily then leads you to
14 conclude that you shouldn't be looking at future emission
15 standards in this waiver proceeding.

16 MR. BROWNELL: If you'd like us to comment, we
17 recognize that there's some ambiguity in the statutory
18 provision. We'll give you our view of what it says, but
19 recognizing the ambiguity, we did go forward and do the
20 additional analysis that looked to the future standards so
21 that you would have that before you when you reviewed the
22 application.

23 MS. SMITH: Okay.

24 MS. GILHOOLEY: I may follow up on some of the
25 questions about the interpretation here. I noticed in your

1 presentation that you stressed that MMT is environmentally
2 safe and causes no health and environmental problems and in
3 your petition as well you've stressed that it wouldn't have
4 any adverse health effects, including with respect to the
5 manganese.

6 I take it you agree then that the health and welfare
7 issues are relevant to EPA's decision on the waiver request,
8 including the effect of manganese.

9 ~~DR. TER HAAR~~ *Mr. Brownell*: We believe that the primary
10 standard, of course, is whether the additive will cause or
11 contribute to the failure of a vehicle to meet emission
12 standards for which they are certified but recognizing the
13 agency's broad discretion and the overall purposes of the
14 Act, to balance the public health, welfare attached to the
15 agency, we view public health as something you will be
16 interested in and therefore addressed it in the application.

17 MS. GILHOOLEY: And that it's relevant in the
18 waiver?

19 ~~DR. TER HAAR~~ *Mr. Brownell*: At least as a secondary, through
20 the purpose section in there.

21 MS. GILHOOLEY: I remember from EDF's comments,
22 they also were saying that they didn't think there was
23 enough data to decide some of the public health issues on
24 manganese. I take it that if EPA agreed that more data was
25 really needed before you could make a responsible decision

1 on the public health effects, would this be as well
2 something that EPA should take into account in exercising
3 its discretion in granting a waiver?

Mr. Brownell

4 ~~DR. TER HAAR~~: Well, of course we believe that
5 there are adequate data on health to make a decision but
6 from the standpoint of legal relevance, we agree that health
7 has some relevance and that your consideration of the
8 adequacy of the data should play a role, be it secondary, in
9 reviewing the waiver application.

10 The way we view the standard, the principle issue you
11 need to be considering is whether it causes or contributes
12 to a failure. As a secondary matter, making sure your
13 decision complies with the overall objectives of the Act,
14 you should be balancing the public health, welfare and
15 productive capacity of the nation in making your decision and
16 we believe of course that all of the research done on the
17 public health issue in the United States, Canada and
18 elsewhere strongly supports our claim that the reductions in
19 criteria pollutants and aromatics are really the important
20 health ... going on.

21 MS. SMITH: That would be one element.

22 MR. ATKINSON: I have a few questions, if I may.
23 As a follow up to the reformulated gasoline questions that
24 were asked a few minutes ago, chart number eight in your
25 presentation has some information on reformulated gasoline

1 and your additive.

2 The question I have is can you describe to me the
3 recipe that you used in calling this reformulated gasoline
4 and in doing the comparison, did you, for example, normalize
5 for octane, go in and try to say, okay, this is what future
6 gasoline is going to be with and without this additive.
7 This additive may enable the refiners to lower octane by a
8 certain amount and if you did that, I'd like to know what
9 those numbers were.

10 DR. TER HAAR: That's more complicated than I can
11 just talk off the top of my head and that's discussed in
12 detail in Appendix 4.

13 Basically, I do know we were -- the goal was towards
14 balanced octane but to see the effect of the aromatics, I
15 think we made a more dramatic reduction in aromatics than
16 probably might occur in the real world.

17 MR. ATKINSON: So this was not a similar situation
18 that you did with your 48 car test where you had essentially
19 the same fuel except in one you added so much MMT?

20 DR. TER HAAR: Yes. Yes. Yes. What we did was
21 we had a -- the difference was in the fuel, we lowered the
22 aromatics, we put the Hi Tec 3000 in that fuel so we have a
23 fuel with higher aromatics plus the oxygenate and a fuel
24 with lower aromatics plus the oxygenate plus the manganese
25 additive. That's the way the studies are.

1 MR. ATKINSON: Okay. Could you comment on the
2 impact to the consumer on the cost of gasoline? How many
3 pennies a gallon or fractions of a penny per gallon will he
4 perhaps be able to save if this waiver were approved, all
5 things else being equal?

6 DR. TER HAAR: I wouldn't want to get into that.
7 That's getting into our customer's pricing. I would not
8 think it would be significant. I should not be more
9 expensive.

10 MR. ATKINSON: Okay. From what we've been hearing
11 this morning, I'd be kind of surprised if it is more
12 expensive.

13 One more question. Touching on environmental
14 accumulation of manganese. The question I had asked in
15 earlier testimony regarding the vitamins and bananas and so
16 forth, it would seem on the surface that if all is true as
17 you presented here and is an accurate representation of
18 what's actually going on in the world, that a very small
19 increase in manganese does not appear to have adverse health
20 effects associated with it.

21 Taking the reformulated gasoline route then, we could
22 maybe extract 3/6ths, some small percentage of benzene out
23 and we are very certain that benzene has very detrimental
24 health effects, carcinogen.

25 That level of detail seems to indicate that this is a

1 positive trade off but with the -- the answer I got back
2 this morning when I asked a similar question was that --
3 would imply that the benzine would deteriorate in the
4 environment and wouldn't accumulate whereas a metal like
5 manganese would. Could you comment on that, please?

6 DR. TER HAAR: Well, first of all I don't think
7 your question ever got answered on whether it was safe to
8 take your vitamin pill or not. I think you're safe to take
9 your vitamin pill.

10 On the accumulation in the environment, we could go
11 through a mathematical thing for you on that here. You're
12 all interested in that. I think it would be appropriate for
13 us to add that into our written comments.

14 I could only say, just to put it sort of into
15 prospective, we have a thousand parts per million in the
16 soil, the concentration is .03 grams per gallon in the
17 gasoline and I think just a little back of the envelop would
18 quickly convince you that if there's a micro gram or two
19 added to the soil over a long, long time, that would be a
20 high number in this calculation and considering the
21 variations in soil concentrations and indeed roadside, right
22 at the roadside concentrations, those would be very small
23 changes compared to that which was present. Very small
24 indeed.

25 But we certainly can give you a -- run through the

1 mathematics for you on that because it's a simple matter of
2 running through -- as was asked earlier, have you looked at
3 that regarding an exhaust system that might have been on an
4 older car, the same kind of concept there, we can do the
5 calculation for you. The concept, I assure you, the data,
6 will come out showing very, very trivial additions to the
7 soil.

8 MR. ATKINSON: Thank you.

9 MS. SMITH: Ms. Silbergeld suggested this morning
10 that yes, EPA should take into account other factors and
11 impacts on emissions and in addition she suggested on the
12 health end of things that it was Ethyl's burden to show that
13 there were no health impacts. Could you comment on that?

14 MR. BROWNELL: As the applicant, we feel that
15 we've come forward and met the burden -- the basic burden
16 based on the research that's been done in the United States
17 and Canada and elsewhere to show that these very small
18 levels of manganese don't really have any health effects.

19 I think it would be fair to say from a legal standpoint
20 because we see health as having some secondary relevance in
21 a proceeding such as this that we would agree that we would
22 have at least the burden of coming forward and making the
23 case with respect to health and that is what we've attempted
24 to do in the waiver application and Appendix 8 to the
25 application and will continue to do in responding to

1 comments from the group today.

2 DR. TER HAAR: I'd add one comment to that. As a
3 person working in health, when one asks us to carry the
4 burden, to prove a negative, to prove it couldn't happen, as
5 we, as scientists know, that is impossible.

6 We can only take the data we have and say those data
7 teach us that it doesn't happen under all the studies that
8 have gone on before.

9 MS. GILHOOLEY: If I might ask a question which is
10 really in the health area, is my recollection of EDF's
11 testimony in response to a question in terms of this overall
12 assessment of the effects of MMT, there was a comment that
13 the cumulative effects of heavy metals were much worse than
14 sort of the ambient, temporary effects of benefits that
15 might come from reductions in other pollutants.

16 Did you have any comment on that, like that the health
17 effects of manganese, because they're cumulative and heavy
18 metal would be worse and would outweigh maybe the benefits
19 that would come from these reductions in other pollutants.

20 DR. TER HAAR: Well, first of all, the airborne
21 pollutants that we have there right now, the EPA, the
22 federal government, the Congress has discerned that those
23 are a problem and feels they are an immediate health effect
24 or I don't believe we'd be spending all this money to lower
25 those things so those things are considered very important

1 right now.

2 We're going to spend, as a nation, incredible sums of
3 money to reach those goals. The concentration build up in
4 the environment is so small compared to the concentrations
5 that are present in the environment, Dr. Silbergeld would
6 delight in trying to relate this to another metal.

7 I suggest that that parallel is totally inappropriate
8 with this essential element, with the very large
9 concentrations in the diet, very high concentrations in the
10 soil, vitamins and so forth. The parallels are not
11 appropriate.

12 MR. KORTUM: I have three questions. The first
13 one is if there was -- your argument about minimizing the
14 effect of a slight hydrocarbon increase depends a lot on
15 replacement of aromatics and therefore a decrease in ... of
16 hydrocarbons and ultimately maybe a decrease or a wash, at
17 least, in terms of ozone in your modeling.

18 If there was a regulatory limit set on aromatics, isn't
19 it true that the use of MMT as an octane enhancer would
20 really be replacing other octane enhancers such as MTBE or
21 something like that?

22 DR. TER HAAR: I don't think so because the
23 refiner -- as was pointed out earlier this morning -- the
24 refiner is just going to be struggling for octane wherever
25 he can get it.

1 He not only faces a lower aromatic content in the
2 gasoline, he faces a lower front end -- they want to low
3 boilers out, he feels it's probable the high boilers will be
4 removed, all of which have tremendous octane capacity.

5 The refiner will be struggling to meet his octane goals
6 and this product is important and it will allow him to do
7 that.

8 MR. KORTUM: My second question is the -- I guess
9 from an engineering standpoint, given the things that are
10 happening over a long-term to the emissions, both the
11 decreases and the slight increase you've seen, from an
12 engineering standpoint I guess what you'd like to do is open
13 up the catalyst and take a look at that sort of invasive
14 type of testing. Do you have any plans for that?

15 DR. TER HAAR: It's worthwhile to take a look and
16 I'm sure we will do that and as we talked to one of the oil
17 companies, be careful what you do with these because once
18 you take them apart, you can't put them back together so we
19 will look very carefully and get much advice before we do
20 anything with these very valuable systems that we have here.

21 But even if we look at these, the only things those
22 will show us is from a scientific interest, why it happened
23 the way it did. The actual facts are best done by long
24 driving to demonstrate that the effect occurs.

25 It's good to run studies that are quick and can predict

1 something but in the end, the long, on the road study tells
2 you that the effect is positive.

3 Certainly, it's going to be intriguing to understand
4 better why the nitrogen oxide catalytic effect occurs as it
5 does and perhaps if we knew more about it we could make it
6 even better. But right now the most important thing is that
7 it works.

8 MR. KORTUM: I guess from a standpoint of looking
9 a future technology it might be very helpful to understand
10 the mechanisms --

11 DR. TER HAAR: Correct.

12 MR. KORTUM: -- to try and make some prediction
13 about what effect this has.

14 DR. TER HAAR: Correct. Correct. We're looking
15 forward -- I'm looking forward to working with the
16 automobile industry and getting their advice on what things
17 would be usefully done with those catalysts. I'm also
18 looking for any input the EPA or any other group of experts
19 might have on what they think might be useful to do with
20 some of those catalysts.

21 I'd like nothing better than to convene a group of
22 people and say let's look at these further and understand
23 what happened in these. At the same time, right now I'm
24 focusing on the study that we've had here and studying these
25 results and presenting these results today.

1 MR. KORTUM: My last question, in our notice we
2 suggested that if MMT became present in all gasoline or a
3 large bulk of the gasoline in this country that the change
4 would probably have to be reflected in the composition of
5 ~~certain~~ ^{certification} fuel. Do you agree with that or have any
6 comments about it?

7 MR. WILKINS: We don't have any comments. That's
8 within the EPA's judgement, I think, to decide.

9 CHAIRMAN WILSON: I think that's all the questions
10 we have today. Thank you very much for your testimony and
11 for the careful way in which both your application and the
12 testimony today have been prepared.

13 Also, thanks to all the other witnesses, again for the
14 thought and care that went into the testimony that we've
15 heard today. As I said, unfortunately, none of these are
16 ever easy. They're never only all pros so we're going to be
17 in a process of trying to judge this application over the
18 next several weeks.

19 We encourage written comments on the waiver application
20 and on today's presentations. I'm sure there are a number
21 of people who didn't appear today that have interests in
22 this issue, obviously two major industries that would be
23 effected are here today testifying but hopefully will
24 present us their views in a written presentations.

25 The comment period for this waiver application ends on

1 July 22nd and the statutory deadline, as I mentioned in the
2 opening, for the final decision is November 5, 1990.

3 Again, thanks to everybody for taking the time and care
4 to come and share your information with us today. Thank you
5 very much.

6 MR. KORTUM: Can I just add that if you'd like to
7 purchase a copy of the transcript you should see the Court
8 Reporter who is sitting right down here.

9 (Whereupon, the hearing in the above-referenced
10 matter was adjourned at 12:15 p.m.)

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REPORTER'S CERTIFICATE

This is to certify that the attached proceedings
before U.S. ENVIRONMENTAL PROTECTION AGENCY

in the matter of: HEARING ON ETHYL CORPORATION FUEL
WAIVER APPLICATION

were held as herein appears and that this is the original
transcript thereof for the file of the Department
or Commission.


Official Reporter

DATE: June 22, 1990